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and by Irzhi Brabenets

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## FOREWORD

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# A NOBEL PRIZE IN CZECHOSLOVAKIA - YAROSLAV GEYROVSKIY

The following is a translation of an article by Irzhi Brabenets in Nauki i Zhizn' (Science and Life), No. 5, Moscow, 1960, pages 14-16.

The notification of the awarding of a Nobel Prize to Yaroslav Geyrovskiy in the field of chemistry in 1959 came to the scientist while he was at work at the Polarographic Institute of the Czechoslovak Academy of Sciences (Prague).

The noted scientist was visited by the Deputy Chairman of the Czechoslovak Academy of Sciences, Academy Member V. Laufberger, and the Chairman of the Department of Chemistry, Academy Member R. Brdichka, who congratulated him warmly.

In response to their greetings, Academy Member Ya. Geyrovskiy stated:

"The awarding of this Nobel Prize does me great honor, as it evidences high regard for my discoveries and work throughout my life. I see this not so much as a personal honor, as it is a recognition of Czechoslovak science and all it has become possible to achieve in recent years as a result of its successful development...In the 37 years since its original discovery, polarography has developed considerably. Great merit in this connection should be accorded my students, and the many specialists in the subject throughout the world. Undoubtedly much credit is due to the Institute of Polarography founded by the Czechoslovak state nine years ago. Its existence has made it possible for our School of Polarography to maintain its leading international status. This, as I see it, is the main source of the great and ever-growing influence of the polarographic method...

However, the important point lies not only in the fact that our social regime provides adequate material means for such successful development in polarography.

For me, the moral support which the state rendered in adopting my work as its own was no less important. This acknowledgement was rendered by the whole of our society. This is important to me, because I tried to make my work useful on that basis. I am particularly happy that a Nobel Prize has been awarded to a citizen of Czechoslovakia, as this serves as a confirmation of my belief that our scientists are, as they have always been, in the front ranks of those striving to create mutual friendships and understanding among the peoples of the world."

The events leading up to this began when Yaroslav Geyrovskiy was taking an examination for the degree of Doctor of Philosophy in 1928.

....One of the examiners was the famous physician, Professor

B. Kuchera, who had not long previously published his work on the surface tension in polarized mercury. This writing dealt with the branch of physical chemistry in which Geyrovskiy was working. It was therefore not surprising that during the examination the discussion led to mention of Kuchera's research. In his experiments, drops of mercury -- the only naturally liquid metal -- flowed from a capillary tube into a vessel with electrolytes. The drops constituted one of the electrodes, and the metal which collected in the bottom of the vessel containing the electrolytes served as the other. Its potential was opposite in charge to that of the mercury in the capillary tube, and remained constant. Kuchera measured the surface tension of the mercury, and determined what it would be on the basis of the potential. On the chart representing this phenomenon, several deviations from the norms were remarked. These had been inexplicable. At the examination Kuchera suggested that the problem could be resolved only on the basis of thorough physical-chemical research, and proposed that Geyrovskiy undertake it.

The young scientist worked four years on this matter, which required profound thought and extensive experimentation. In 1922, Geyrovskiy began using a galvanometer to measure the electrical current which passed through the electrodes which the drops formed, with oxygen in the electrolytes, or small quantities of undissolved salts. It was thus discovered that by this method the curves of the relationship of the force of the constant current passing through the circuit to the tension could be very precisely studied. Continuing this line of work, Geyrovskiy became convinced that the new method -- polarography -- held a great potential for the study of electrode processes and analytical chemistry. From that time on, Professor Geyrovskiy devoted his entire attention to polarography.

This Czech scientist was the first to establish this new branch of science which has blazed a trail in international sciences. However, the task assigned by Kuchera has not as yet been entirely accomplished.

Research by the polarographic method on a solution is done with two electrodes in an electric circuit; one is mercury flowing from a capillary tube, one drop every few seconds. This electrode, which is constantly renewing itself, makes it possible to take measurements independent of the element of time. The second electrode is used only for purposes of comparison. When the electric current passes through a solution, a relationship is set up between its force and the tension applied. This is graphically expressed in a graduated curve. The height of each graduation (the polarographic wave) indicates the amount of matter contained in the solution, and the electric tension under which the wave is created indicates the nature of the substance. The principal advantage of the polarographic method lies in its tremendous sensitivity. This method helps to determine the presence in a solution of an infinitesimal quantity of an element, compound, or organic matter, which amounts could not have been detected, for example, by spectral analysis. Polarography has been applied in many branches

of production, and has been put to important uses in medicine.

Automatic polarographic analyzers which operate over a continuous period have been installed at the Polarographic Institute of the Czechoslovak Academy of Sciences, where Professor Geyrovskiy himself is working. With these, it is possible over a period of only a few weeks not only to analyze, but also to correct, certain production processes. Thanks to this possibility, these instruments have begun to play an extremely important role in the automation of production.

The name of Professor Yaroslav Geyrovskiy -- the founder of polarography and the most eminent specialist in that field -- soon became well-known abroad. In 1933 he lectured for six months in the USA, and the following year, he lectured in Moscow and Leningrad, where he also took part in the celebration of the 100th anniversary of D. I. Mendeleev's birth. Professor Geyrovskiy's works evoked a great response in the Soviet Union. By 1937, his manual on polarography had been translated into Russian. Geyrovskiy always maintained a close relationship with Soviet scientists: in the period between 1936 and 1939, served as Deputy Chairman of the Scientific Section of the Czechoslovak Society for Friendship With the USSR.

His fruitful activities were highly regarded both in his homeland and abroad. He was given state awards and the Order of the Republic. He was elected a member of the Academy, made President of the Polarographic Society in London, and was given honorary membership in several Academies of Science and foreign scientific societies. On 26 October 1959, these many acknowledgements of Geyrovskiy's contributions were crowned by the award of the Nobel Prize.

Academy Member Geyrovskiy is continuing to work modestly, as before, in the laboratory of the Polarographic Institute, where new and special methods and improved instruments, whereby polarography is being extended to new fields, are being created. In the work of the Institute, Professor Geyrovskiy's students, for whom he, as the founder of polarography, always has time, continue their research. A self-effacing scientist, thinking man, patient teacher, and brilliant pioneer in a progressive branch of science -- such is Academy Member Geyrovskiy, whose work has led to Czechoslovakia's first Nobel Prize.

(Journal "Czechoslovakia", No. 1 1960)

# FIGURE CAPTIONS

/Page 24 of original/ -- Winner of the Nobel Prize, Academy Member Yaroslav Geyrovskiy.

/Page 25, top, of original/ -- The award ceremony in which Academy Member Geyrovskiy, right, received the diploma as Laureate of the Nobel Prize from the King of Sweden, Gustav Adolph VI (left).

/Page 25, bottom, of original/ -- Yaroslav Geyrovskiy devotes his moments of leisure to music.

/Page 26 of original/ -- Academy Member Geyrovskiy (left) with his student, R. Brtichka (right), working on a method for observing the process of development in cancerous tumors.

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